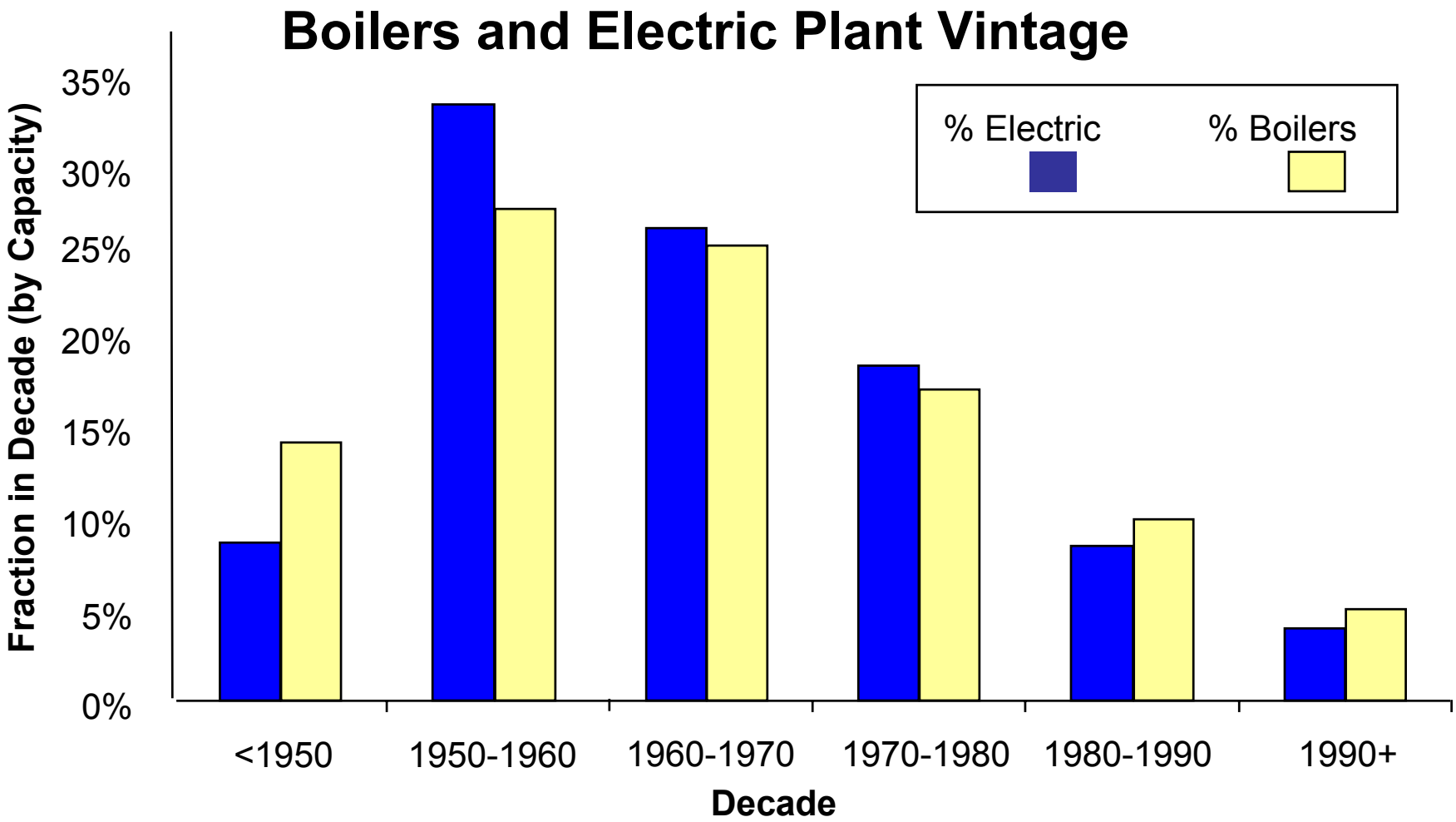
Regulatory Education & Outreach for New Technologies

Offices of: Distributed Energy & Electric Reliability, Solar/PV, Fuel Cells & Hydrogen, Building Technologies

U.S. Department of Energy

Aging Heat & Power Generation



Sources: Energy Information Administration, Gas Research Institute

The current energy delivery system is up to 97% inefficient; this (1) impacts the cost of business in the U.S., (2) affects the price of electricity, heating and air conditioning to you, and (3) plays a role in domestic security

Losses

67%

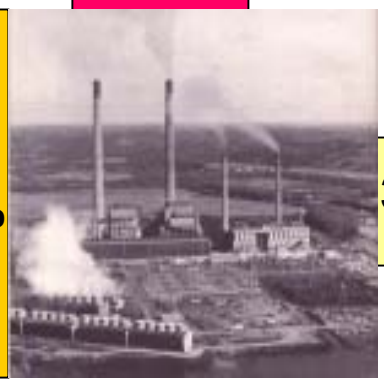
4%

26%

Useful Light

3%

100%



33%

(7-11% 0f electricity)

29%

29%

29%

12%

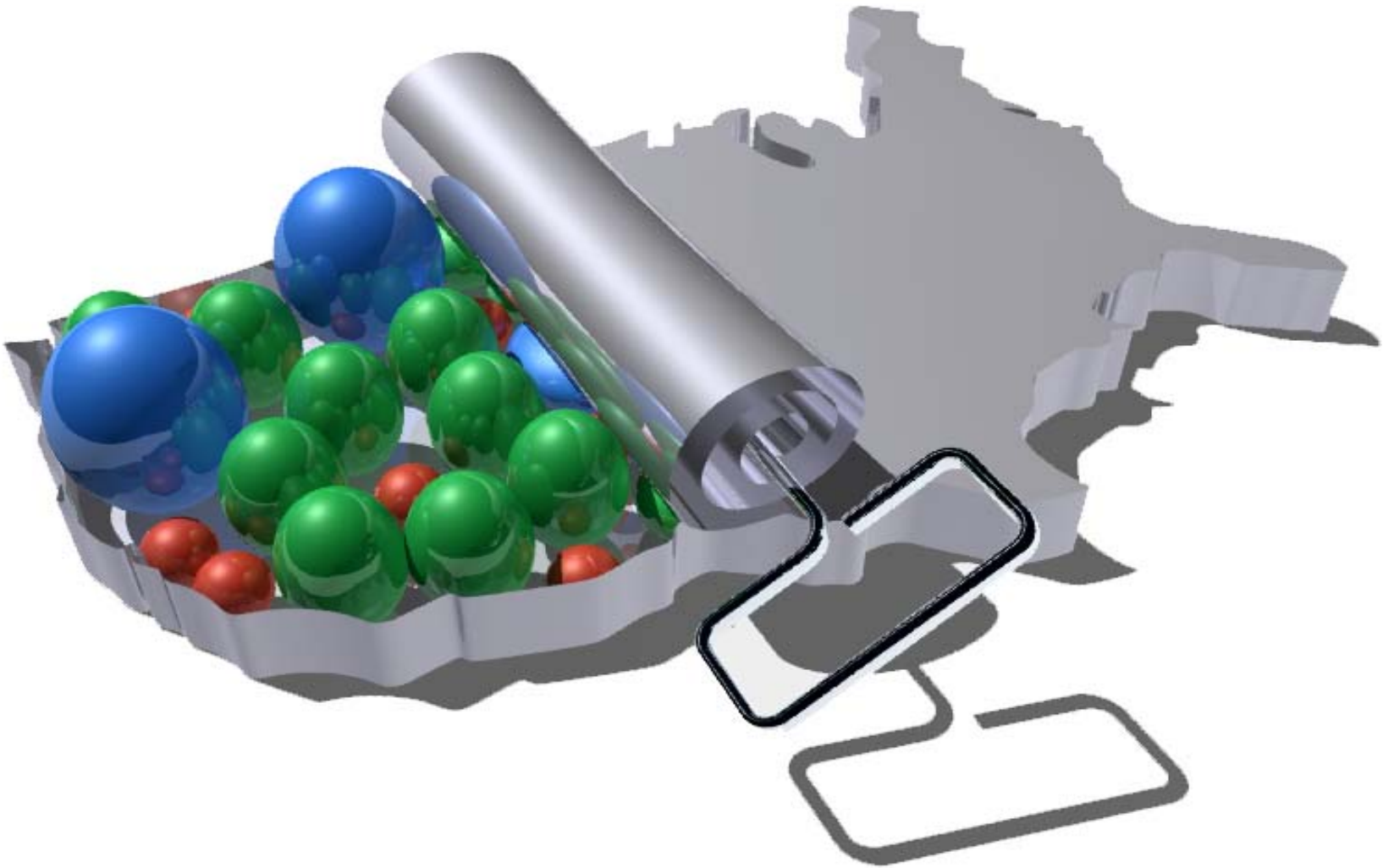
29%

LED

25%

Fuel in

U.S. consumers are getting smarter…….



The Federal Role

The DOE does not REGULATE energy (your state utility commission does that); it furthers the Administration's goals by:

- ✓ long-term R&D programs
- ✓ Technical and economic analyses, public and regulatory education programs

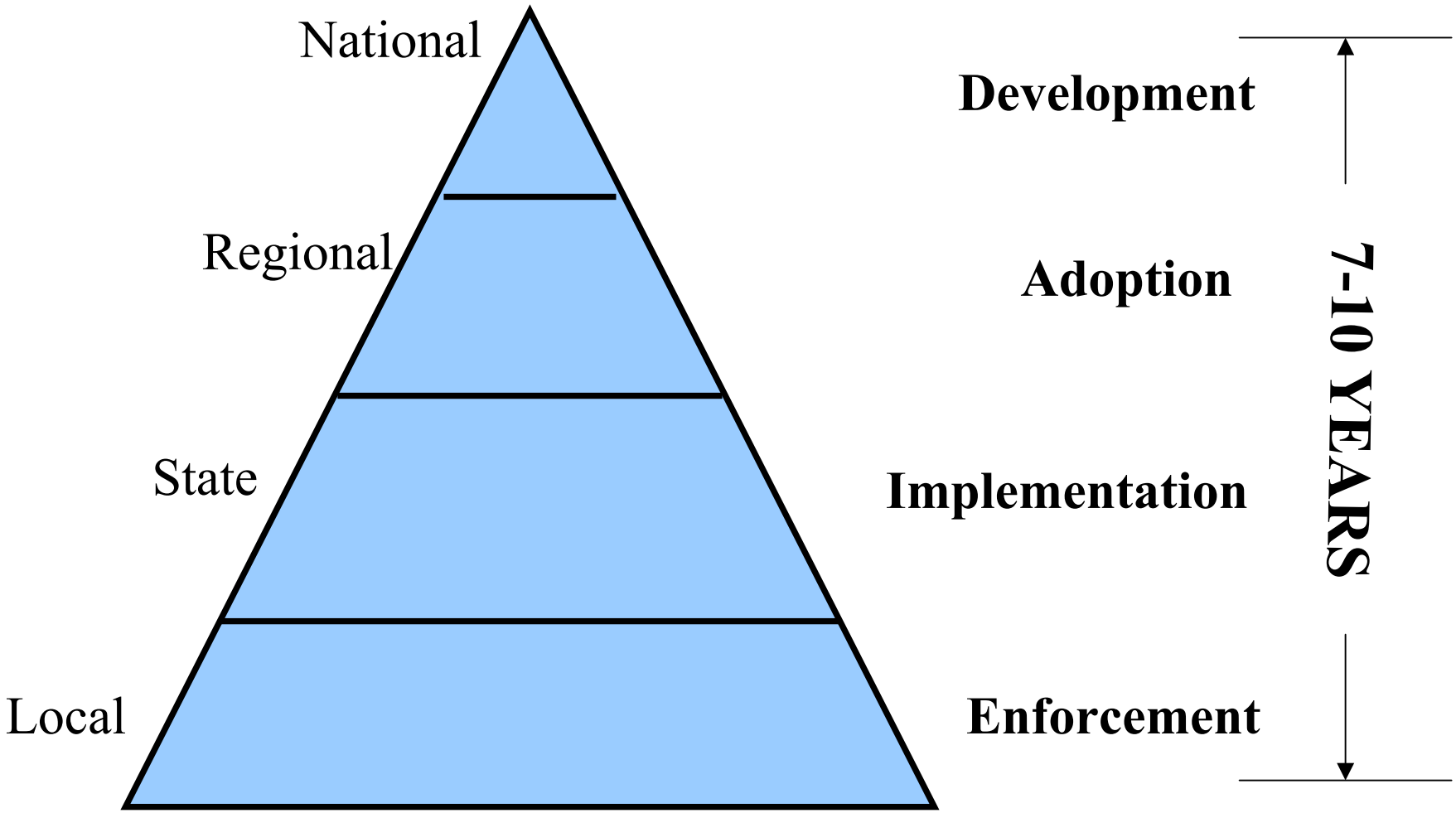
Offices of: Distributed Energy Resources; Fuel Cells & Hydrogen Infrastructure; Solar Technologies; Building Technologies…..

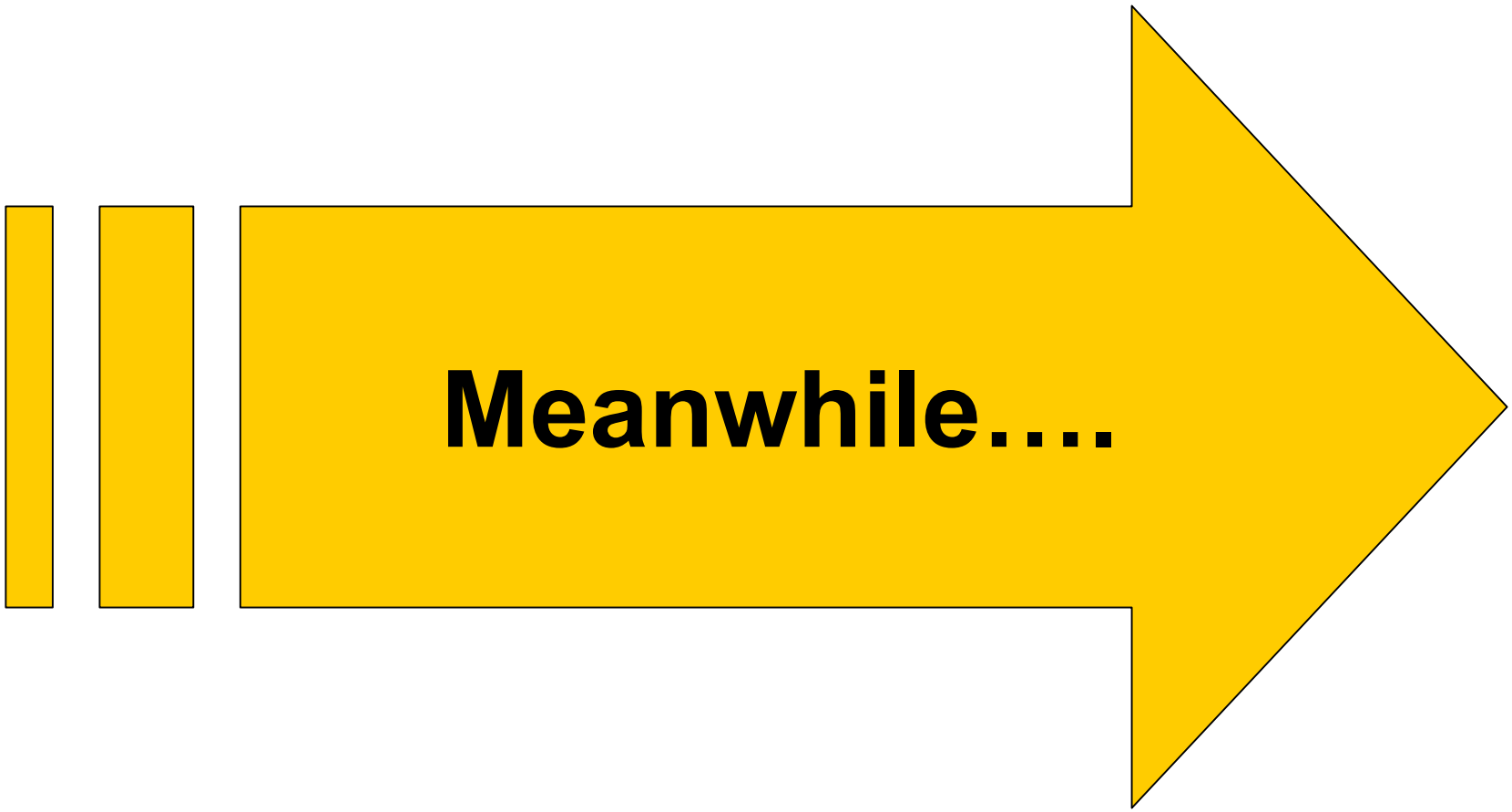
- Microturbines, reciprocating engine generator sets, fuel cells, solar heaters & photovoltaic systems
- Materials, energy storage, power electronics
- Fuel production systems, transmission & storage
- Combined heat and power (CHP), “power parks,” building cooling, heating & power (BCHP, thermally-activated technologies)
- Equipment, bldg. and electrical interconnection standards; communications & control

DE Codes & Standards
U.S. DOE Program Support

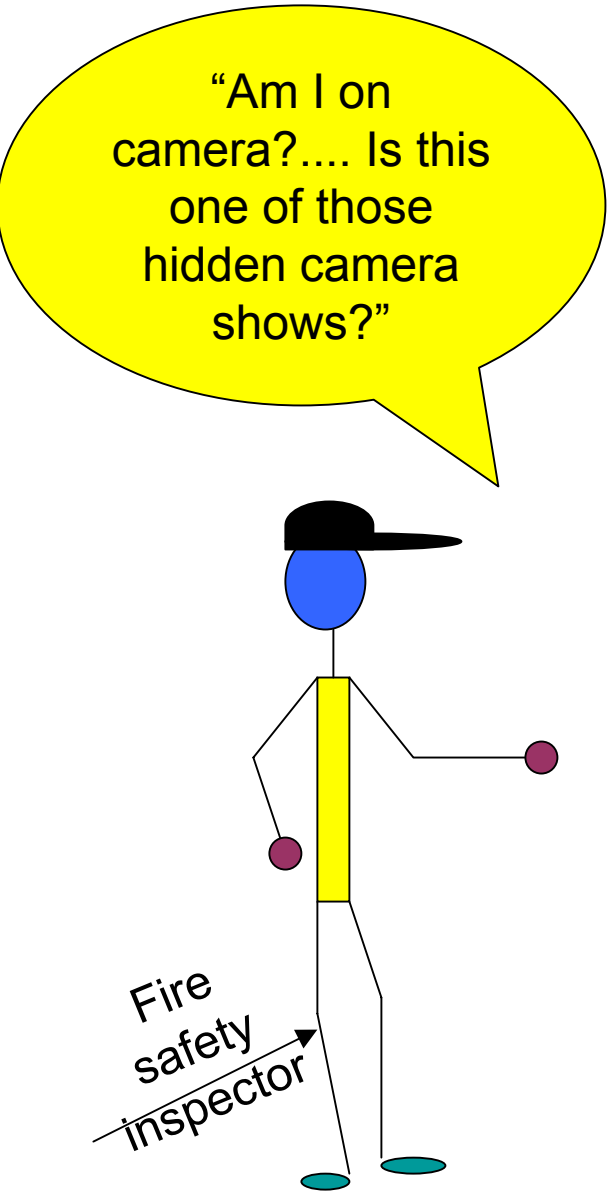
- Fuel Cells/Hydrogen, Neil Rossmeissel, Tel: 202-586-8668 neil.rossmeissel@ee.doe.gov
- Microturbines, Debbie Haught, Tel: 202-586-2211 debbie.haught@ee.doe.gov
- BCHP, Ronald Fiskum, Tel: 202-586-9154, ronald.fiskum@ee.doe.gov
- Electrical Interconnection, Richard DeBlasio (NREL), 303-275-4333, deblasid@tcplink.nrel.gov
- State & Local Education/Outreach, Anne-Marie Borbely-Bartis (Battelle), Tel: 202-586-5196, anne-marie.borbely-bartis@ee.doe.gov

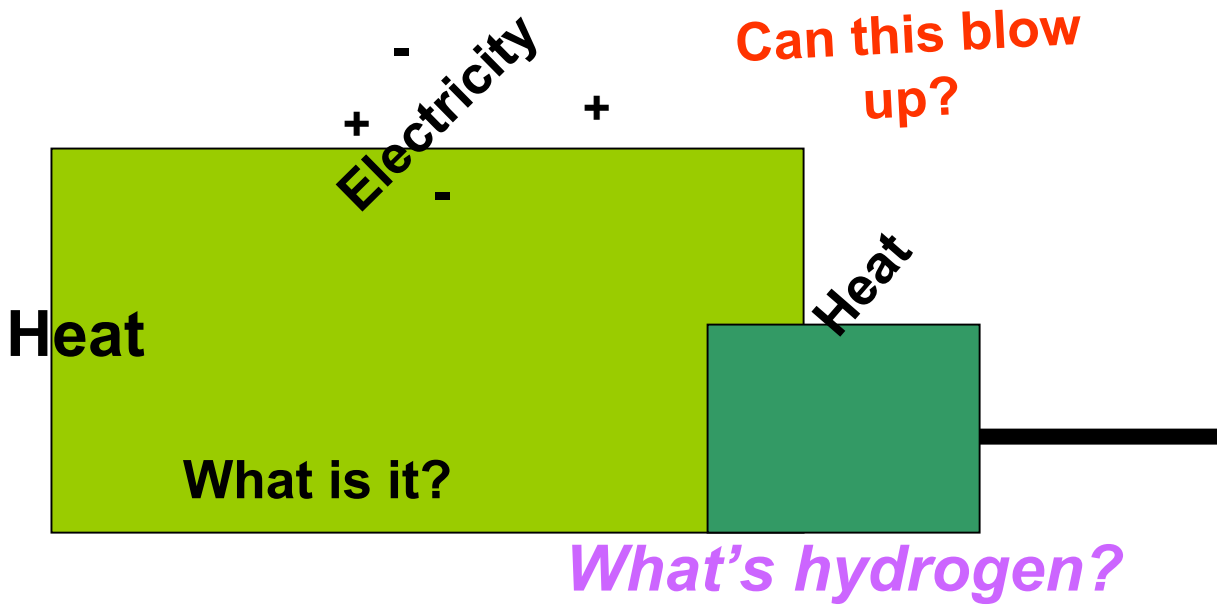
From National Standards to Local Building Codes:




Meanwhile….

Actual fuel cell permitting experience (location omitted)





Case Study: Microturbine

- 30-kW Microturbine (natural gas fired)
- “Benign” emissions signature (low NOx)
- Grid-parallel, grid-independent
- UL2200 Certification
- Certified under NY State Interconnection Guidelines

Case Study – Microturbine, cont.

- Fargo, ND – Holiday Inn & Conference Center
  - 1 30-kW unit (M330-SA) with Unifin heat recovery system
  - Installed inside bldg., in mechanical room
  - Utilizes “low pressure” natural gas (11 lbs.)
  - No electrical interconnection with grid
  - Feeding all electrical and thermal output directly into boiler

Case Study – Microturbine, cont.

Action	Cost ($000s)
• Upgrade 50 yds. Natural gas pipeline (1 lb. To 11 lbs.)	4.0
• Mechanical inspector required:	
all pipeline connections to be welded	3.0
VF drive for additional combustion air into room	6.0
new chimney to outside	3.0
• Electrical inspector required:	
Grounding only	n/a
• Additional modem phone line	n.a
• Engineering labor and materials	14.0
Total Installation estimate:	**30.0**

Case Study – Fuel Cell

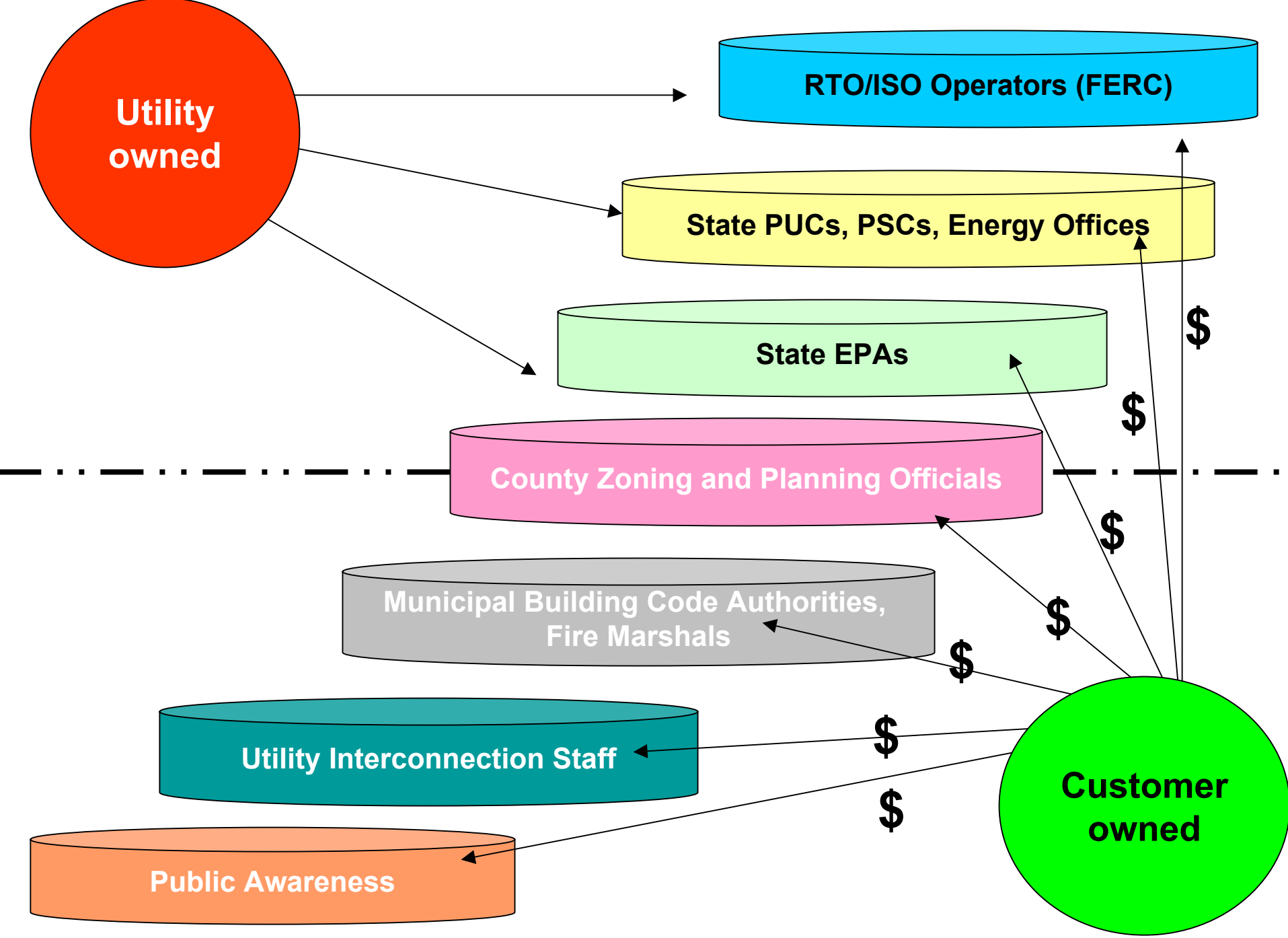
- 2-5kW PEM fuel cell system and fuel reformer
- Utilizing methanol as feedstock on first units
- 300-gallon “tote” retrofitted as onsite storage tank, piping system
- Relevant code: NFPA 30 and 30A, Combustible Liquid Fuels
- BPA has funded 110 alpha and beta units, currently installing first 10 units across Pacific Northwest

Case Study -- Fuel Cell, cont.

- Fire Marshals in urban areas requiring the following on methanol systems:
  - Additional setbacks from walls, doors, windows, public access
  - Automatic shut-off valve during periods of no demand
  - Signage, fire extinguisher
  - Tank must be fenced, protected from vehicular impact
  - All pipes that enter building must be welded; all invisible joints must be welded

Case Study – Fuel Cell, cont.

- Methanol fuel system requirements, cont:
  - 12-ft. ventilation stack
  - Emergency relief venting system – 18-in. manhole w/loose bolts
  - Seismic calculations
  - Secondary containment system
  - Sight glass on storage container
  - Static electricity management system – grounded tank, toad, etc.
  - Pressure test on all pipes and tanks, with Fire Marshall observing
  - Road uneven – must be re-graded


Utility owned
RTO/ISO Operators (FERC)
State PUCs, PSCs, Energy Offices
State EPAs
County Zoning and Planning Officials
Municipal Building Code Authorities, Fire Marshals
Utility Interconnection Staff
Public Awareness
Customer owned
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So…….

Welcome to the U.S. DOE Road Show!

ASK QUESTIONS

Ask questions ask questions ask questions ask questions ask

For more information on Distributed Energy Road Shows:

http://www.eere.energy.gov/der/roadshow.html